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09/749,917	12/29/2000	Christopher C. Chang	015290-458	6832

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EXAMINER	
UHLIR, NIKOLAS J	
ART UNIT	**PAPER NUMBER**
1773	

DATE MAILED: 02/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/749,917	CHANG ET AL.
	Examiner	Art Unit
	Nikolas J. Uhlir	1773

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 08 September 2003.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 14-17,19-36 and 39 is/are pending in the application.

4a) Of the above claim(s) ______ is/are withdrawn from consideration.

5)☐ Claim(s) 23-24 is/are allowed.

6)☒ Claim(s) 14-17,19-21,25-36 and 39 is/are rejected.

7)☐ Claim(s) ______ is/are objected to.

8)☐ Claim(s) ______ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on ______ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. ______.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date ______.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. ______ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: ______.

DETAILED ACTION

1. This office action is in response to applicants amendment/arguments dated 9/08/2003. Claims 14-17, 19-36, and 39 are pending. The applicants amendment/arguments are sufficient to overcome the prior applied 35 U.S.C 103(a) rejections of the instant claims. Accordingly, these rejections are withdrawn. However, the applicant's amendment/arguments do not place the application in condition for allowance in lieu of the new grounds of rejection stated below.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 14-17, 19-21, 25-29, 31-33, and 35-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Richardson et al. (US5916454) in view of Ding et al (EP0845545).

4. The limitations of claim 14 require a component of a plasma etch reactor, wherein the component is selected from the group consisting of a plasma confinement ring, a focus ring, a pedestal, a chamber wall, a chamber liner, and a gas distribution plate, wherein the component has one or more surfaces exposed to a plasma during processing, wherein the component comprises an as sprayed plasma sprayed coating on the plasma exposed surface of the component, wherein the coating has an as-sprayed surface roughness that promotes the adhesion of polymer deposits.

5. With respect to these limitations, Richardson teaches a method for reducing byproduct particle generation in a plasma-processing chamber. The method includes

providing a chamber interior part that has a roughness specification designed to promote the adhesion of byproduct particles to its surface (column 2, lines 25-32), specifically polymer particles generated during etching processes (column 5, lines 5-10). Examples of suitable chamber interior parts that can be roughened include the chamber walls and a gas injection port (column 6, lines 33-43).

6. Richardson et al. fails to teach a coating for a plasma chamber part, wherein the coating has an as-sprayed surface roughness that promotes the adhesion of polymer deposits, as required by claim 14. However it is noted that Richardson specifically teaches that byproduct particle deposition on chamber components is a problem that is known to occur in etching and deposition chambers utilized to process semiconductor substrates (column 1, lines 5-23).

7. Bearing the above in mind, Ding teaches forming plasma sprayed coating over the surface of plasma chamber parts to improve the adhesion of particles deposited on its surface (column 5, lines 37-56 and column 6, lines 19-21). The coating composition reduces intrinsic stress between the chamber part and the deposited particles thereby increasing the adhesion of the coating particles to the chamber part, and preventing the contamination of substrates processed in the chamber (column 5, line 57-column 6, lines 15-21). In addition, Ding et al. teaches that applying this coating to chamber parts that have been previously roughened improves the adhesion of the plasma sprayed coating to the chamber part itself (column 6, lines 41-45).

8. One would have been motivated to make this modification for the following reason: Although Richardson teaches that roughening the surface of a plasma chamber

part is sufficient to increase the adhesion of particles to its surface, Ding teaches that by further coating the surface of a roughened chamber part with a plasma sprayed coating, intrinsic stresses between the deposited particles and the chamber part can be relieved, thereby **further** improving the adhesion of the particles to the chamber part. Further, Ding teaches that the roughness of the plasma deposited coating improves the adhesion of particles to chamber parts by providing increased contact area between the particles and the chamber part. Still further, one would have been motivated to make this modification in light of the fact that the roughened chamber part of Richardson is an ideal substrate for the coating of Ding, as Ding teaches that roughening the component of the reactor prior to applying the plasma sprayed coating improved the adhesion of the plasma sprayed coating to the substrate. While the examiner acknowledges that Ding is drawn to a sputtering chamber, Richardson clearly states that the problem of byproduct particle generation is known in both deposition and etching chambers. Thus, as Ding is drawn to improving the adhesion of particles to a deposition chamber, Ding and Richardson are not non-analogous art.

9. The limitations of claim 15 require the component to be made from a metallic or a ceramic material. With respect to these limitations, Richardson teaches that the chamber walls are suitably manufactured from anodized aluminum, which is a known ceramic material (Al_2O_3) (column 3, lines 50-55). Thus, the limitations of claim 15 are met when the walls of Richardson are coated with the plasma sprayed coating of Ding.

10. The limitations of claim 16 require a component of a plasma etch reactor, the component comprising aluminum having an anodized or un-anodized plasma exposed

surface, wherein the component comprises an as-sprayed plasma sprayed coating on a plasma exposed surface of the component, wherein the coating has an as-sprayed surface roughness that promotes the adhesion of polymer deposits formed during etching of semiconductor substrates in the plasma etch reactor. These limitations are met as set forth above for claim 14.

11. The limitations of claim 17 require the component of a plasma etch reactor having the same features as required by claim 16 to be manufactured from a ceramic selected from alumina, zirconia, yttria, silicon carbide, silicon nitride, boron carbide, and boron nitride. These limitations are met as set forth above for claim 16, as anodized aluminum has the formula Al_2O_3, which is also known as alumina.

12. Regarding the limitations of claims 19 and 20, wherein the applicant requires the coating to be a ceramic or a polymeric material (claim 19), specifically ceramics such as alumina, yttria, zirconia, silicon carbide, silicon nitride, boron carbide, and boron nitride. Ding et al. teaches that a suitable coating composition form improving the adhesion of particles is plasma sprayed aluminum (column 5, lines 37-56). Thus, as aluminum is known to form a thin layer of aluminum oxide on its surface unless special precautions are taken to prevent this oxidation, the examiner takes the position that the limitations of claims 19 and 20 are met, as aluminum oxide has the formula Al_2O_3, which is also known as alumina.

13. The limitations of claim 21 require a component of a plasma etch reactor, wherein the component is coated with a plasma sprayed coating having an as sprayed surface roughness that promotes the adhesion of polymer deposits formed during

etching of semiconductor substrates in the plasma reactor, wherein the component and the coating comprise the same ceramic material, wherein the ceramic material is selected from alumina, yttria, zirconia, silicon carbide, silicon nitride, boron carbide, and boron nitride. The limitations of this claim are met as set forth above for claims 19 and 20.

14. The limitations of claim 25 require the coating to have an arithmetic mean surface roughness of 150-190 microinches. Richardson et al. discloses that plasma reactor components are typically manufactured to maximize their smoothness, because this allows for a tight seal with other parts, easy cleaning, and low moisture absorption. However, this leads to increased particle contamination (column 5, lines19-35). The amount of particle contamination is reduced by roughening the surface of a chamber component, thereby increasing the adherence of byproduct particles to the component surface (column 5, lines 43-48). Thus, the examiner takes the position that the surface roughness of a plasma reactor interior component is a results effective variable. One would roughen the surface to improve byproduct adhesion, and one would smooth the surface to promote easy cleaning and low moisture absorption. Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to optimize the roughness of the coated interior components taught by Richardson as modified by Ding to a desired range in order to achieve the desired balance between increasing the adhesion of byproduct particles and seal, cleaning, and moisture absorption properties.

15. The limitations of claim 26 are met as set forth above for claim 14.

16. The limitations of claim 27 require a method for processing a semiconductor substrate in the plasma etch reactor of claim 26, wherein the method comprises contacting the exposed surface of a substrate with a plasma. Richardson et al. teaches exposing the surface of a substrate to a plasma (column 4, lines 35-52), and teaches that polysilicon (a known semiconductor) as a suitable substrate (column 5, lines 1-10). Thus, the limitations of claim 27 are met by the combination of Richardson et al. with Ding et al.

17. Regarding the limitations of claim 28, wherein the applicant requires a method for processing a substrate the reactor of claim 27, the method comprising positioning the substrate onto a substrate support in the reactor; introducing a process gas into the reactor; applying RF energy to the process gas to generate a plasma adjacent an exposed surface of the substrate; and etching the exposed surface of the substrate. Richardson teaches a method for processing a substrate comprising all of the required steps of claim 28 at column 4, lines 35-53. Thus, the limitations of claim 28 are met by the combination of Richardson et al. and Ding et al.

18. The limitations of claim 29 require the process gas to comprise a polymer forming species. Richardson et al. teaches a specific process gas that forms carbon-based polymers when the gas is used in a processing chamber (column 5, lines 1-11). Thus, the limitations of claim 29 are met.

19. The limitations of claim 31 require the component to be a gas distribution plate, and further requires the process gas to be introduced through openings in the gas distribution plate. Richardson et al. teaches that the process gas is introduced through a

gas injection port, which is a ring shaped manifold (gas injection port) having a plurality of holes for releasing gaseous source materials (column 3, line 65-column 4, line 5). It is the examiners position that this ring shaped manifold is equivalent to the applicants claimed gas distribution plate. The obviousness of coating the gas injection port is established as set forth above for claim 14.

20. The limitations of claim 32 require the component to comprise a ceramic material. This limitation is met as set forth above for claim 17.

21. The limitations of claim 33 require the coating to be a polymeric material. The examiner acknowledges that neither Richardson et al. nor Ding et al. specifically teach this requirement. However, Ding et al. specifically teaches that the coating material is adventitiously formed to be similar, if not identical to the material that is deposited on it. I.e. if aluminum is deposited, the coating is flame sprayed aluminum (column 5, lines 50-55 of Ding et al.). By doing this, the differences between the coefficient of thermal expansion of the coating and the deposited material can be reduced, thereby increasing particle adhesion (column 5, line 50-column 6, line 9). Richardson et al. teaches an embodiment wherein a certain process gas results in the deposition of carbon based polymers on the surface of the plasma chamber parts (column 5, lines 1-11 of Richardson et al.).

22. Therefore it would have been obvious to one with ordinary skill in the art at the time to utilize a plasma sprayed polymer coating on the rough surfaced plasma chamber part taught by Richardson et al.

23. One would have been motivated to utilize polymeric material as the coating material taught by in this particular situation due to the fact that the deposited material of Richardson is a polymer material, and the fact that Ding et al. specifically teaches the if the plasma sprayed coating is similar or identical to the material that is expected to be deposited on it, the effects of intrinsic stress between the deposited material and the component and the effects of thermal stress between the deposited material and the plasma sprayed coating can be reduced, thereby increasing the adhesion of the deposited material.

24. The limitations of claim 35 require the coating material to comprise a material selected from yttria, alumina, zirconia, silicon carbide, and boron nitride. These limitations are met as set forth above for claims 19 and 20.

25. The limitations of claim 36 are met as set forth above for claim 19 and 20.

26. Claims 14-17, 19-21, 25-36, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yin et al. (WO99/20812) in view of Richardson and Ding.

27. Regarding the limitations of claim 14, Yin et al. (Yin) teaches a plasma etch reactor (pages 1-2). This plasma etch reactor comprises an enclosed etching chamber having chamber walls, a process gas inlet (i.e an aluminum oxide gas distribution plate), and a plasma generator (see figure 1 and pages 9-12). Materials commonly used to fabricate the components of the enclosed chamber include anodized aluminum (page 9). Portions of the enclosed chamber are coated can be coated with a ceramic, such as aluminum oxide, boron carbide, boron nitride, silicon, silicon oxide, silicon carbide, or

silicon nitride to protect the walls from eroding when the chamber is cleaned (page 12). It is noted that Yin teaches that during semiconductor etching, polymeric deposits adhere to the chamber walls and other components (pages 1-2).

28. Yin fails to teach a plasma sprayed coating having an as-sprayed surface roughness that promotes the adhesion of polymer deposits, as required by claim 14.

29. However, Richardson teaches that byproduct particle deposition on chamber components is a problem that is known to occur in etching and deposition chambers utilized to process semiconductor substrates (column 1, lines 5-23). These particles adhere to chamber surfaces, and over time flake off and contaminate the substrates (see column 1). Richardson teaches that to improve the adhesion of these deposits, the surface of the chamber parts (which can be made of aluminum oxide) should be roughened (column 3, lines 15-64)

30. Bearing the teachings of Richardson in mind, Ding teaches forming plasma sprayed coating over the surface of plasma chamber parts to improve the adhesion of particles deposited on its surface (column 5, lines 37-56 and column 6, lines 19-21). The coating composition reduces the intrinsic stress between the chamber part and the deposited particles thereby increasing the adhesion of the coating particles to the chamber part, and preventing the contamination of substrates processed in the chamber (column 5, line 57-column 6, lines 15-21). Further, the porosity of the coating relieves thermal stress between the particles and the coating and improves the adhesion of the particles to the chamber parts (column 5, line 55-column 6, line 15). Ding et al. teaches that a suitable coating for improving the adhesion of particles is

plasma sprayed aluminum (column 5, lines 37-56). It is noted that aluminum is known to oxidize to aluminum oxide unless special precautions are taken. As no such precautions are elucidated by Ding, the examiner takes the position that at least some of the plasma sprayed coating of Ding is in the form or aluminum oxide, which is also known as alumina.

31. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to coat the plasma etch reactor interior components (i.e. walls, gas distribution plate etc.) taught by Yin with plasma sprayed aluminum, as taught by Ding.

32. One would have been motivated to make this modification to increase the adhesion of polymeric particles to the surface of the plasma chamber components taught by Yin. The examiner acknowledges that Yin is directed towards a etching reactor and that Ding is drawn to a deposition chamber. However, Richardson teaches that flaking of particles deposited on the surface of either etching and deposition chamber parts is problematic, and in both cases improving the adhesion of the particles is desirable. Thus, Yin and Ding are not non-analogous art. Further, Yin teaches that many of the components of the etch chamber can be coated with a ceramic. Coating the components of Yin with plasma sprayed aluminum would do just that, as aluminum is known to form a thin layer of aluminum oxide, a known ceramic, unless special precautions are taken to prevent this oxidiation. Further, though Yin is drawn to the removal of polymeric deposits from the walls of a chamber, the cleaning chemistry utilized to accomplish this task is specifically taught to be suitable for removing

polymeric deposits that are "strongly adhered to" substrates including ceramics (see page 5).

33. Claim 15 requires the component to be made of a metallic or ceramic material. This limitation is met as set forth above for claim 14.

34. Claim 16 requires essentially the same limitations as claim 14, but requires the component to have a plasma exposed surface formed of aluminum or anodized aluminum. This limitation is met as set forth above for claim 14.

35. Claim 17 requires the component to be made of one of the materials specifically listed. As set forth above for claim 14, the reactor components in Yin are typically made from anodized aluminum. Anodized aluminum has the chemical formula Al_2O_3, which is also known as alumina. Thus, claim 17 is met.

36. Claim 19 requires the coating to be a ceramic or a polymeric material. This limitation is met as set forth above for claim 14.

37. Claim 20 requires the coating to be selected from one of the materials listed. This limitation is met as set forth above for claim 14, as plasma sprayed aluminum will necessarily oxidize to aluminum oxide (i.e. alumina) unless special precautions are taken to prevent such oxidation.

38. Claim 21 requires the component and the coating to be made of the same material, specifically one of the ceramics listed. This limitation is met as set forth above for claim 14, as both the component and the coating are made of aluminum oxide.

39. Regarding the limitations of claim 25, wherein the applicant requires the coating to have an arithmetic mean surface roughness of 150-190μin. Richardson et al.

discloses that plasma reactor components are typically manufactured to maximize their smoothness, because this allows for a tight seal with other parts, easy cleaning, and low moisture absorption. However, this leads to increased particle contamination (column 5, lines19-35). The amount of particle contamination is reduced by roughening the surface of a chamber component, thereby increasing the adherence of byproduct particles to the component surface (column 5, lines 43-48). Thus, the examiner takes the position that the surface roughness of a plasma reactor interior component is a results effective variable. One would roughen the surface to improve byproduct adhesion, and one would smooth the surface to promote easy cleaning and low moisture absorption. Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to optimize the roughness of the coated interior components taught by Yin as modified by Richardson and Ding to a desired range in order to achieve the desired balance between increasing the adhesion of byproduct particles and seal, cleaning, and moisture absorption properties.

40: Claim 26 is met as set forth above for claim 14.

41. Claim 27 requires a method for etching a semiconductor substrate, comp[rising exposing the substrate to a plasma in the reactor of claim 26. Yin teaches etching a semiconductor substrate by exposing it to a plasma (see pages 20-23). The remainder of the limitations of claim 27 are met as set forth above for claim 26.

42. A method meeting the requirements of claim 28 is taught on pages 19-23 of Yin.

43. Claim 29 requires the process gas to comprise a polymer forming species. Yin teaches this limitation at the bottom of page 1 to the beginning of page 2.

44. Claim 30 requires the plasma exposed surface of the substrate to comprise a metallic material or an oxide. Yin teaches that the substrate is typically a semiconductor material such as Si (page 19). Further, the substrate is coated with one or more layers, such as SiO_2 (page 19). Thus, the limitations of claim 30 are met.

45. Claim 31 requires the component to be a gas distribution plate where the process gas is introduced via the gas distribution plate. Yin teaches that the one of the suitable interior components of the plasma etch chamber include a gas distribution plate for introducing the process gas (see page 17 2nd paragraph). The examiner maintains for the reasons set forth above that it would be obvious to one of ordinary skill in the art at the time the invention was made to coat any of the interior components of the plasma etch chamber taught by Yin with the plasma spayed aluminum coating taught by Ding.

46. Claim 32 requires the component of claim 14 to comprise a ceramic material, this limitation is met as set forth above for claim 21.

47. Claim 33 requires the coating to be a polymeric material. The examiner acknowledges that neither Yin, Richardson, or Ding specifically teach this requirement. However, Ding et al. specifically teaches that the coating material is adventitiously formed to be similar, if not identical to the material that is deposited on it. I.e. if aluminum is deposited, the coating is flame sprayed aluminum (column 5, lines 50-55 of Ding et al.). By doing this, the differences between the coefficient of thermal expansion of the coating and the deposited material can be reduced, thereby increasing particle adhesion (column 5, line 50-column 6, line 9). Yin teaches that the process gas used in

the etch chamber forms polymeric deposits on the surface of the plasma chamber parts (page 1-2 of Yin).

48. Therefore it would have been obvious to one with ordinary skill in the art at the time to utilize a plasma sprayed polymer coating on the surface of the interior plasma chamber parts taught by Yin.

49. One would have been motivated to utilize polymeric material as the coating material taught by in this particular situation due to the fact that the deposited material of Yin is a polymer material, and the fact that Ding et al. specifically teaches the if the plasma sprayed coating is similar or identical to the material that is expected to be deposited on it, the effects of intrinsic stress between the deposited material and the component and the effects of thermal stress between the deposited material and the plasma sprayed coating can be reduced, thereby increasing the adhesion of the deposited material.

50. Claim 34 requires a component of a plasma etch reactor that has one or more plasma exposed surfaces, wherein the component comprises a plasma sprayed coating on a plasma exposed surface of the component that has not been roughened, wherein the coating is one of the ceramics listed by the claim or a metallic material, wherein the coating promotes the adhesion of polymer deposits formed during processing of etching semiconductor substrates in the plasma etch reactor. These limitations are met as set forth above for claim 14, as Yin does not teach roughening the chamber parts, and the coating utilized by Yin as modified by Richardson and Ding as set forth above meets applicants claimed composition and functional requirements.

51. Claim 35 is met as set forth above for claim 17.

52. Claim 36 is met as set forth above for claim 14.

53. Claim 39 is met as set forth above for claims 34 and 25.

54. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Richardson et al. (US5916454) in view of Ding et al (EP0845545) and applicants own admissions.

55. Richardson as modified by Ding does not teach that the plasma exposed surface of the semiconductor substrate comprises a metallic material or an oxide.

56. However, applicants own admission, see the specification page 1, lines 19-26 and page 2, lines 1-10 (discussion of background art) shows that "in semiconductor integrated circuit fabrication, devices such as component transistors may be formed on a semiconductor wafer or substrate, which is typically made of silicon. Metallic interconnect lines, which are typically etched from a metallization layer disposed above the wafer, may then be employed to couple the devices together to form the desired circuit. The metallization layers typically comprise copper, aluminum or one of the known aluminum alloys such as Al--Cu, Al--Si or Al--Cu--Si. An anti-reflective coating (ARC) layer and an overlying photoresist (PR) layer, may be formed on top of the metallization layer." "To form the aforementioned metallic interconnect lines, a portion of the layers of the layer stack, including the metallization layer, can be etched using a suitable photoresist technique. The areas of the metallization layer that are unprotected by the mask may then be etched away using an appropriate etching

source gas, leaving behind metallization interconnect lines or features."

57. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a semiconductor conductor substrate having a plasma exposed metal surface as the substrate in Richardson as modified by Ding, as applicants own admission clearly establishes that the use of such a substrate was known at the time the invention was made.

Allowable Subject Matter

58. Claims 23-24 are allowed.

59. The following is a statement of reasons for the indication of allowable subject matter: While the plasma deposition of polymer materials such as polyimide is known, as shown by EP0546802 (Beals et al.), there is no motivation in the prior art to coat a plasma exposed part of a plasma processing chamber with such a coating. Further, even if there were motivation to coat a plasma chamber part with a plasma sprayed coating, there is no teaching in the prior art that doing so would result in a coating that improves the adhesion of polymer deposits, as required by the instant claims. Accordingly, the examiner deems claims 23 and 24 to be allowable over the prior art.

Response to Arguments

60. Applicant's arguments filed 9/08/03 have been fully considered but they are not persuasive. The applicants argument with respect to the rejection of claims 14, 19, 20, and 34 under 35 U.SC 103(a) over Ding et al. alone are moot as this rejection has been withdrawn.

61. With respect to the rejection of the instant claims as obvious over Richardson as modified by Ding, applicants arguments have been fully considered but are not persuasive. Applicant argument focuses on the following points: 1) Ding is directed towards a sputtering chamber and thus is not suggestive of an etch reactor; and 2) Ding teaches away from plasma sprayed coating having different composition from that of the deposited particles; 3) The coating of Ding is designed to be a different material then that of the component part.

62. These points are unpersuasive. Though the examiner acknowledges that Ding is directed towards a sputtering chamber whereas Richardson (and Yin) are directed towards etching chambers, Richardson specifically acknowledges that the problem of byproduct particle deposition onto plasma chamber parts is present in both etching and deposition chambers. See Richardson, column 1, lines 10-25. Thus, one of ordinary skill in the art would recognize that a coating for adhering particles generated in a plasma deposition chamber would likely be useful for adhering particles in a plasma etching chamber. Thus, the examiner maintains that Ding and Richardson (as well as Ding and Yin) are not non-analogous art.

63. Further, the examiner acknowledges that Ding does teach that the composition of the coating and the deposited particles are preferably similar to one another or the same material (see Ding column 5, lines 45-55). This feature in Ding is to improve the adhesion of particles to the coating by reducing thermal stress between the particles and the coating. However, the recitation of a preferred embodiment does not teach away from other embodiments that may be suitable. The examiner specifically notes

that Ding teaches that the roughness/non-unifomity of the plasma sprayed coating provides increased contact area between the deposited particles and the coating, thereby increasing the adhesion of the particles (see column 6 lines 9-16 of Ding). Thus, while the examiner acknowledges that it is preferable for the coating and the deposited particles to be the same material, one of ordinary skill in the art at the time the invention was made would have been motivated to utilized the Ding coating because Ding teaches that the coating will improved adhesion of byproduct particles by providing increased contact area between the particles and the coating, even if the coating and the deposited particles were not the same composition.

64. Last, it is acknowledged that the Ding coating is designed to reduce thermal stress between the coating and the plasma chamber part. However, Ding does not *require* that the coating and the plasma chamber part be different materials. In fact, given Dings teaching that the thermal stress between the coating and the part is desirably minimized, one of ordinary skill would recognize that using the same material for the coating and the plasma chamber part would be adventitious, because they would have the *exact same* coefficient of thermal expansion, which would eliminate thermal stress between the coating and the plasma chamber part completely.

Conclusion

65. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nikolas J. Uhlir whose telephone number is 571-272-1517. The examiner can normally be reached on Mon-Fri 7:30 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul J. Thibodeau can be reached on 571-272-1516. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

NJU

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